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THE SUPERIOR BRANCH

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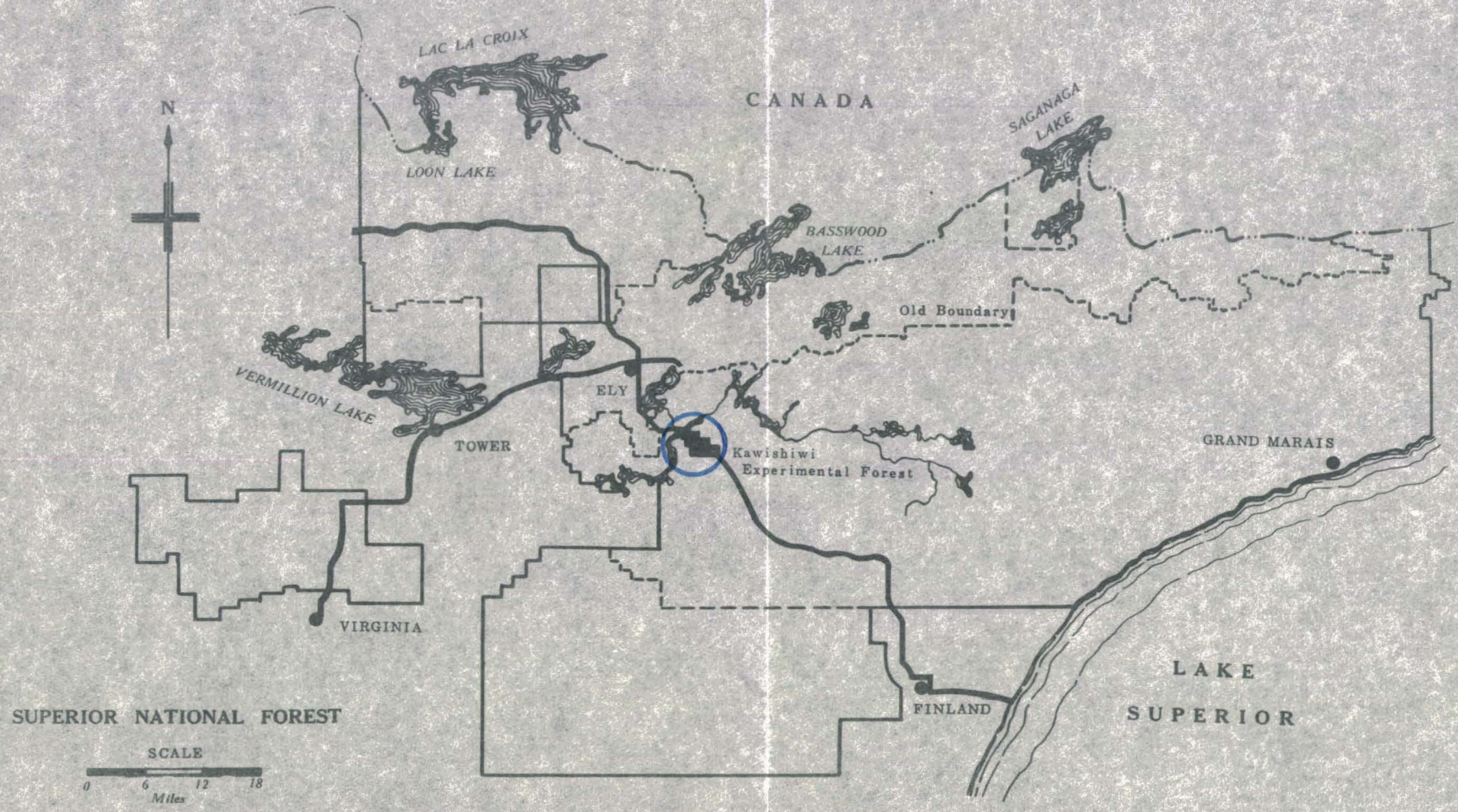
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THE SUPERIOR BRANCH

LAKE STATES FOREST EXPERIMENT STATION

Minnesota can look forward to restored productivity of its forest lands – if proper care is taken of our present forests.

What is proper care? This is the question that the Lake States Forest Experiment Station intended to answer when it established in 1931 in northeastern Minnesota the Kawishiwi Experimental Forest.

The past extensive fires, coupled with wasteful and destructive exploitation of the forest, have unfortunately encouraged the growth of low-quality and short-lived trees on this forest. The natural balance between plants and wild life has been upset so extensively that it would take several centuries for Nature to restore the forest completely to its former primitive condition. Unaided, Nature is too slow for practical purposes and often does not produce the timber best suited to human needs. Despite fire and logging, however, there is a promising young forest, much of which is merchantable, requiring management.

Hence the chief responsibility of the Experiment Station is to determine the best means of managing the forest by working with Nature. This calls for making studies looking toward the substitution of pine and spruce for low quality species, stimulation of growth on lands already stocked with desirable species, determination of the methods of cutting that will keep the forest lands productive, and coordination of the various types of forest management with recreation, game management, and scenic value.

The Superior National Forest of which the experimental area is a part was created from the Public Domain in 1909. Previous to this date, most of the valuable mature pine had been acquired by homesteaders and lumber companies so that the timber under the custodianship of the Forest Service consisted mainly of spruce swamps and young stands of jack pine and aspen.

This young timber had come in on land swept by great fires between 1855 and 1900. When the Forest Service began the management of these lands, most of the trees were between 10 and 40 years of age. Through the passing years, these young stands have grown into timber having considerable commercial value.

In addition to the National Forest land, there are also large

amounts of forest land in the possession of settlers, timber companies, mining companies, the State of Minnesota and on Indian lands where practical results of forest research may be applied.

Since the land is not suitable for agriculture because of the extremely rocky condition of the soil, much of the privately owned land was abandoned after the timber had been removed. Within recent years, considerable amounts of this cut-over land has been bought by the Federal government and added to the National Forest.

THE KAWISHIWI EXPERIMENTAL FOREST

Experimental work on the Superior National Forest was started on a very small scale in 1926. Later an experimental area was set aside from the Superior National Forest where research could be concentrated, the work made more efficient and the experiments made more accessible for demonstration purposes. This area, the Kawishiwi Experimental Forest, was proclaimed by the Chief Forester in 1931. It has a net area of about 2800 acres and is situated 13 miles southeast of Ely on State Highway No. 1. The headquarters development is near Halfway Ranger Station on the South Kawishiwi River.

The major physical improvements consist of a group of administrative buildings, and a road and trail system.

The forest is composed largely of jack pine, black spruce, aspen, and paper birch, although there are also small groups or scattered individuals of white pine, Norway pine, white spruce, and tamarack. Both upland and swamp types are present. The timber is mainly suitable for pulpwood, mining timber and fuelwood. The accompanying tables show the acreage of timber types and the volume of merchantable timber.

INVESTIGATIONS

Cut-over area survey.

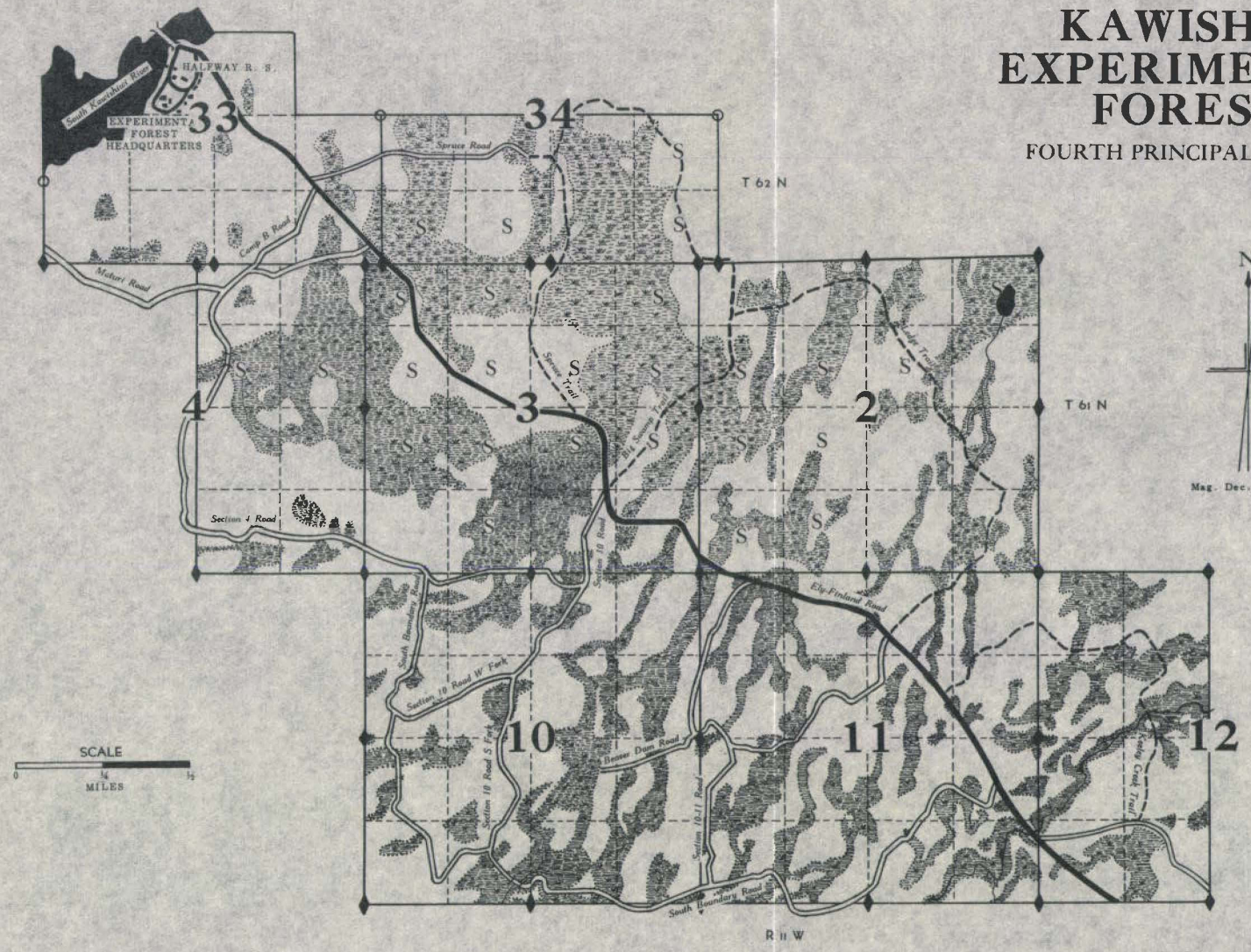
One of the first major projects undertaken at the station was a survey of the old cuttings on both private and National Forest land to determine the results of past timber operations. The results of this survey showed:

1. Past cutting practices did not result in the maintenance of desirable species on most types.

2. Following cutting, tree species consisting largely of aspen and birch quickly spring up and cover the ground.

KAWISHIWI EXPERIMENTAL FOREST

FOURTH PRINCIPAL MERIDIAN



3. The shade resistant spruce and balsam will eventually replace the short lived aspen and birch type.

4. The main problem is how to maintain and perhaps increase the proportion of Norway pine, white pine, jack pine, white spruce and black spruce in the stands.

Northeastern Minnesota lies in the transition zone between the typical pine forests of Minnesota and the spruce-balsam forests of Canada. It has representative areas in both types of forest and a mixture of the two. For this reason, the forest problems are very complex.

Usually the best research can be done on permanent sample plots where the trees can be remeasured from time to time to determine accurately the effect of various treatments. These plots vary in size from a small fraction of an acre to fifteen acres, depending upon the character of the particular job. Ninety of these have been established.

Jack pine cutting experiments.

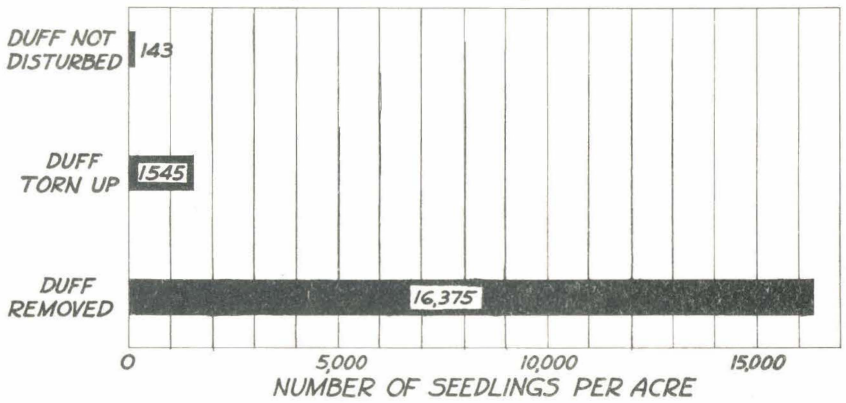
The most common forest type having commercial value is jack pine. Three major cutting experiments and numerous small plots have been established to study the problem of successfully reproducing this type following cutting.

A clue to the management of this type has been found from studies of the cones and seed. Unlike most trees, the jack pine seeds do not fall from the trees soon after ripening but are retained in the cones for many years. The cones are remarkably good storage containers and many of the seeds are capable of germination even after they are several years old. However, when a jack pine tree is felled and the branches are severed from the trunk, the cones quickly open in warm, dry weather. In the light of this, it is a mistake to pile and burn jack pine slash, thus destroying all seed.

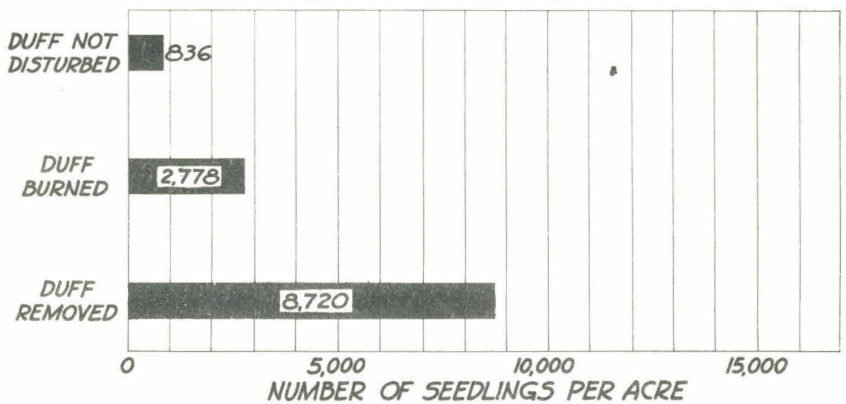
An important obstacle to jack pine reproduction is the thick mat of needles and moss on the ground which prevents the seeds from reaching good mineral soil. Methods of overcoming the difficulty by breaking up this layer with mechanical implements or destroying it by burning are being studied. The accompanying chart shows the effect of such treatments upon germination.

EFFECT OF SOIL TREATMENT UPON REPRODUCTION

JACK PINE
(CLEAR CUT AREA)



BLACK SPRUCE
(HEAVILY CUT AREA)



Spruce

The problems of managing spruce swamps are different from those of handling jack pine because of the peat soil and ability of spruce to grow in shade. Several methods of cutting which offer possibilities are being tried in a thirty-five acre cutting. There are certain types of swamps where careful cutting and skidding to prevent damage to small trees may be the only special effort that is required. In other places, light selection cuttings may be best.

Thinnings and release cuttings

Young stands of timber of valuable species often suffer from too close spacing or overtopping by inferior species such as aspen. By cutting out some of the trees, the growth rate of the remaining stand is increased, and by removing trees of undesirable species, the value of the final crop is enhanced. The studies involve the degree of thinning or releasing and the effect on rate of growth.

Remarkable results from releasing plantations of Norway pine from overtopping aspen have been obtained.

Planting experiments

The objects of the planting experiments are to study proper species to plant, methods of planting and caring for plantations, protection from animals and effect of source of seed. Planting is usually done with seedlings which have been grown in nurseries but some forestation work is done by the direct sowing of seed. Both the suitability for planting and the value of the crop produced have to be considered in deciding on the species of trees to plant.

OTHER ACTIVITIES

Minor lines of investigation include studies of the growth, form and volume of trees.

Not all of the work which has been described is carried out on the experimental forest. When problems are discovered which cannot be studied on the experimental forest, plots are established where the problems exist.

An important phase of the work consists of showing the ex-

periments to students, foresters, and others who are interested. A cordial invitation to visit the experiment station is extended.

AREA BY TYPES

Type	Area (Acres)	Per cent
Jack Pine	959	34
Aspen	441	16
Mixed Upland	414	15
Black Spruce (Upland)	160	6
Black Spruce (Swamp)	430	16
Non-productive Swamp	322	12
Miscellaneous	40	1
TOTAL	2,766	100

MERCHANTABLE VOLUME

Species	Volume	
	Cords	Board Feet (1000)
Jack Pine	2,027	3,810
Aspen & Birch	3,782	1,639
Spruce	4,421	-
Others	296	146
TOTAL	10,526	5,595